The most successful recent improvements in basic reactor shield attenuation calculations are principally associated with the Monte Carlo method, for which the techniques of importance sampling, generalized quota sampling, and the use of expected values have been further developed. Another technique, numerical integration of the Boltzmann equation (the NIOBE code), has been very useful in the calculation of neutron spectra in shields, although with present available computer capacities it is not applicable for source distributions in which the forward-scattered component can predominate. For situations in which the geometry is complicated it has been expedient to integrate point-to-point attenuation kernels.

Shielding experiments have advanced principally in the detail of measurement. Thus neutron spectra in a water shield around a reactor have been obtained with a semiconductor spectrometer. The transmission of radiation through concrete has been measured for the case of a collimated source at several angles of incidence. And clean measurements have been made of the secondary gamma-ray production in a variety of shield materials surrounding a small neutron source. These last measurements have been used to provide input data for the shield-synthesis technique, in which shields are designed systematically by choosing materials or mixtures of materials for optimum performance by consideration of their density, neutron and gamma-ray attenuation, and secondary gamma-ray production.

Recognizing the importance of keeping track of shielding information, the U. S. Atomic Energy Commission has formed at Oak Ridge National Laboratory a Radiation Shielding Information Center. This organization collects and evaluates shielding information, records an evaluated list of sources on computer tape, and publishes a readout (which is an annotated bibliography) from time to time. It also collects shielding computer codes and investigates their relative capabilities. It assists shielders in finding information or obtaining codes on request.